



# EVI-5 Science: Science Evaluation and Programmatic Considerations

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# Outline

1. Overview of the NASA Earth Science Goals
2. Science Evaluation and Selection Process.
3. Key Differences Between EVI-5 and EVI-4 and Between Draft and Final EVI-5 Solicitations.
4. EVI-5 Library.



## Earth Science Focus Areas

The *2014 Science Mission Directorate Science Plan* is available through the EVI-5 Library and can also be found at <http://science.nasa.gov/about-us/science-strategy/>.

The NASA Earth science research program strives to advance Earth system science and has goals in the following six *Science Focus Areas* and *Applied Sciences* as well as interdisciplinary programs:

- Atmospheric Composition
- Weather
- Carbon Cycle & Ecosystems
- Water & Energy Cycle
- Climate Variability & Change
- Earth Surface & Interior
- Further the use of Earth system science research to inform decisions and provide benefits to society

The focus areas and their main aims are articulated in the *2014 Science Plan*.



# 2017 Decadal Survey

Earth Venture Instrument-5  
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## Six Science and Applications Areas

- (1) Coupling of Water and Energy Cycles;
- (2) Ecosystem Change;
- (3) Extending and Improving Weather and Air Quality Forecasts;
- (4) Reducing Climate Uncertainty and Informing Societal Response;
- (5) Sea Level Rise; and
- (6) Surface Dynamics, Geological Hazards and Disasters.

35 Decadal Survey science questions



# NASA Key Earth System Science Questions

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- How is the global Earth system changing?
- What causes these changes in the Earth system?
- How will the Earth system change in the future?
- How can Earth system science provide societal benefit?



# EVI-5 PEA: Key Info (1 / 2)

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## Science Scope is broad

- EVI-5 solicitation will be an open call to address science from any of the Earth Science Focus Areas
- Venture class is not intended to be a mechanism for accelerating the implementation of Decadal Survey missions; however,
- Missions whose objectives overlap those of Decadal Survey missions may be proposed, assuming they meet other criteria in terms of science, innovation, schedule, and cost.

## Solicits Instrument and CubeSat Investigations

that should be *complete investigations*, including science.

**Partnerships** are encouraged, however the stability & reliability of the partnership will be considered as a risk element in the proposal



# EVI-5 PEA: Key Info (2 / 2)

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- PI-managed investigations with NASA Life Cycle Cost Caps as follows:
  - The proposed PI-Managed Mission Cost shall be no more than \$108M for Class C instrument or \$35M for Class D instrument or CubeSat based investigations in FY 2022 dollars.
  - Possible \$5M Science Enhancement Opportunity (SEO) for Class D and CubeSat investigations.
  - The PI-Managed Mission Cost excludes the integration of the instrument to the selected platform or the integration of the CubeSat(s) to the selected launch vehicle but includes proposed science activity in Phase D and all of Phases E and F.
- Life Cycle Schedule
  - Delivery of Class C Instrument (end of Phase C) by 2024.
  - Delivery of Class D Instrument (end of Phase C) by 2023.
  - Delivery of CubeSat(s) (during Phase D) by 2023.
- Access to Space
  - NASA will arrange and specify access to space.
  - Proposals should discuss appropriate orbits and accommodation requirements for the proposed investigations.
  - Proposals may include information on any research the proposing team has done relative to potential hosting platforms. This is not a requirement for any proposal.
- Single-Step Evaluation & Selection Process



# EVI-5 PEA: Budgets

## **Reminder: What is included in the PI-Managed Mission Cost?**

- Cost of the Instrument (Phases A-C) and/or CubeSat(s) (Phases A-C and part of Phase D)
- Science Team support, Algorithm Development, Calibration & Validation
- Key management and engineering staff during Phase D (Project Manager, Instrument Manager, Systems Engineer, etc.) assuming a 2-year Phase D
- Post-launch instrument commissioning activity (within Phase D)
- Phase E & F – e.g., Operation & Ground processing, Data Analysis & proposed data product generation
- Any Student Collaboration cost above 1% of the PI-Managed Mission Cost
- Communication Program (partially)

## **What is not part of PI-Managed Mission Cost, yet required in proposal?**

- Investigation Costs during a potential gap between completion of instrument or CubeSat(s) and start of integration (planning budget up to 4 years, on a per-year basis for Instruments and planning budget up to 2 years, on a per-year basis for CubeSat(s))
- Costs of the integration and test to selected platform (within Phase D) (planning budget nominally 2 years for Instruments and 1 year for CubeSats)



# Payload Classification; Data Policy; Contributions; Education & Communications

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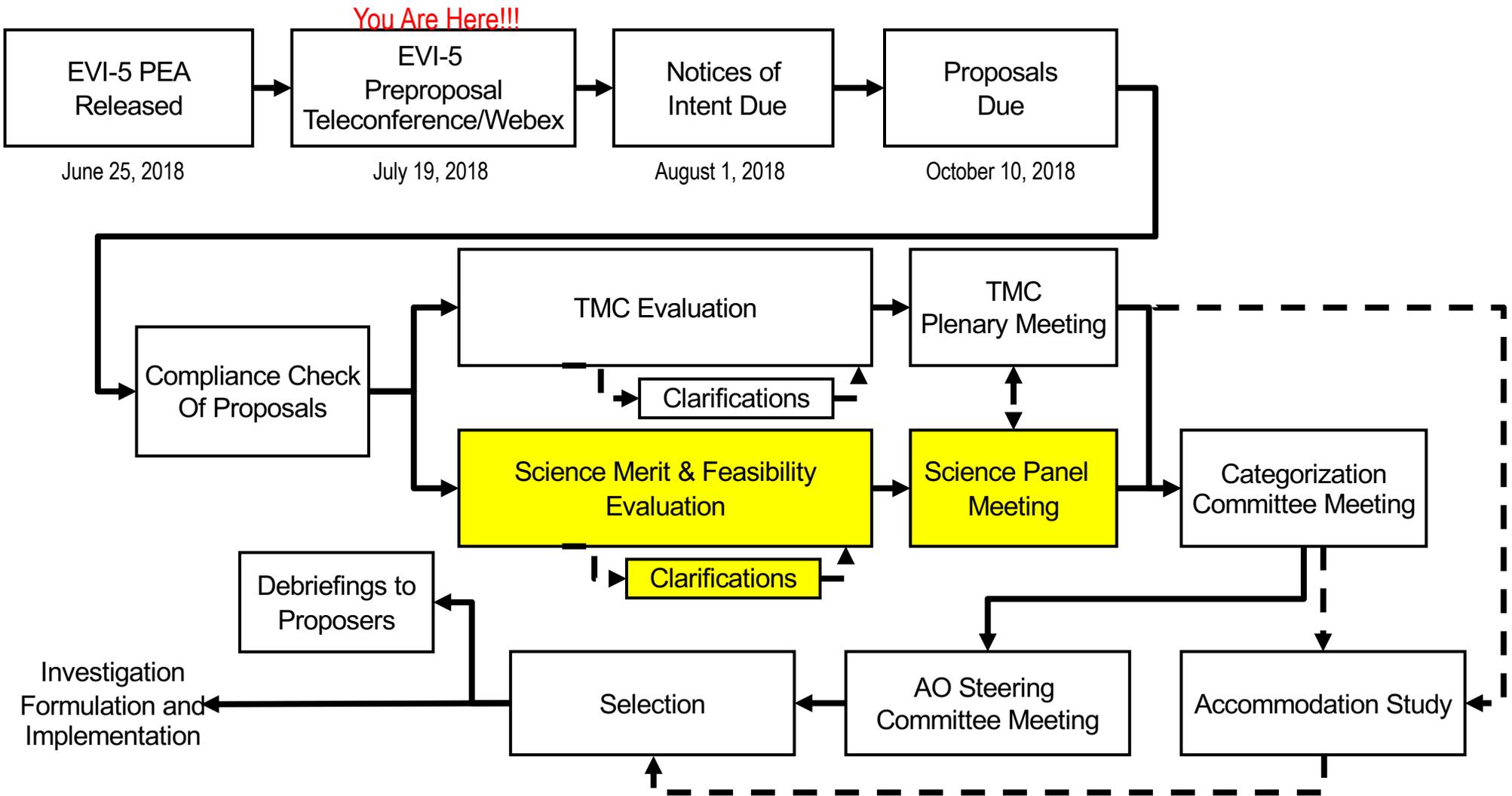
- Payload Classification: Class C or Class D (see cost limits)
- Standard NASA Earth Science Data Policy for Mission data, no period of exclusive use.
- Complementary Data - Each proposal shall clearly outline which ongoing or planned set of observations (outside the proposed mission), if any, are required for the proposed investigation to achieve its baseline mission science investigation. The proposal shall describe how the high-level science requirements will be impacted if such observations do not exist when the proposed investigation is in operations.
- No limit on non-NASA or non-US contributions
  - Contributions to the investigation (part of hardware and/or investigators) on a no-exchange-of-funds basis is permitted with no cost limitations.
  - Enabling partnerships are encouraged, however the stability & reliability of the partnership will be considered as a risk element in the proposal
- Education and Communications Programs are not required. A Communication Program may be required, pending further NASA guidance for communication policy, and those costs will be outside the PI-Managed Mission Cost cap. See PEA for more details.



# Proposal Evaluation & Selection

EVI-5 Pre-Proposal Web Conference

## EVI-5 PEA Solicitation, Evaluation and Selection Flow





# Evaluation Criteria & Clarifications

## Evaluation criteria reminder from 7.2 of SALMON-3 AO

- Intrinsic Science Merit of the Proposed Investigation ~ 40%
- Experiment Science Implementation Merit and Feasibility of the Investigation ~30%
- Technical, Management, and Cost (TMC) Feasibility of the Investigation Implementation, including Cost Risk ~ 30%.

## Clarifications reminder from 7.1 of SALMON-3 AO

- Proposers should be aware that, during the evaluation and selection process, NASA may request clarification of specific points in a proposal. A typical limited response is to direct NASA's attention to pertinent parts of the proposal without providing further elaboration.



# Science Evaluation (1 / 6)

EVI-5 Pre-Proposal  
Web Conference

## Science Panel Factor A

Factors A-1 to A-6. Intrinsic Science Merit of the Proposed Investigation:  
Please refer to Section 7.2.2 of the SALMON-3 AO for details.

- Factor A-1. Compelling nature and priority of the proposed investigation's science, goals and objectives.
- Factor A-2. Programmatic value of the proposed investigation.
- Factor A-3. Likelihood of science success.
- Factor A-4. Science value of the Threshold Investigation.
- Factor A-5. Merit of any Science Enhancement Options (SEOs), if proposed.



# Science Evaluation (2 / 6)

EVI-5 PEA  
Evaluation Plan

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## SALMON-3 Update to Factor A Evaluation:

The Intrinsic Science Merit of the Proposed Investigation also includes the following addition to Factor A-2:

Factor A-2, programmatic value of the proposed investigation, also includes the extent to which the proposed science investigation addresses unique science areas that are not being addressed by other missions (both NASA and non-NASA missions) expected to be in operation five to ten years from the start of the proposed investigation.



## Science Panel Factor B Evaluation

Factors B-1 to B7. Experiment Science Implementation Merit and Feasibility of the Proposed Investigation: Please refer to Section 7.2.3 of the SALMON-3 AO for details.

- Factor B-1. Merit of the instruments and investigation design for addressing the science goals and objectives.
- Factor B-2. Probability of technical success.
- Factor B-3. Merit of the data analysis, data availability, and data archiving plan and/or sample analysis plan.
- Factor B-4. Science resiliency.
- Factor B-5. Probability of investigation team success.
- Factor B-6. Merit of Science Enhancement Option (SEO), if proposed.



# Science Evaluation (4 / 6)

EVI-5 PEA  
Evaluation Plan

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## SALMON-3 Update to Factor B Evaluation:

The Experiment Science Implementation Merit and Feasibility of the Proposed Investigation also includes the following additions to Factor B-3:

Factor B-3, merit of the data and/or sample analysis plan, also includes the quality of the plans for calibration and data archiving, including development of a data pipeline.



# Science Evaluation Findings (5 / 6) EVI-5 Pre-Proposal Web Conference

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- **Major Strength:** A facet of the implementation response that is judged to be of superior merit and can substantially contribute to the ability of the project to meet its scientific objectives.
  - **Major Weakness:** A deficiency or set of deficiencies taken together that are judged to substantially weaken the project's ability to meet its scientific objectives.
  - **Minor Strength:** A strength that is worthy of note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of merit.
  - **Minor Weakness:** A weakness that is sufficiently worrisome to note and can be brought to the attention of Proposers during debriefings, but is not a discriminator in the assessment of merit.
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# Science Evaluation Ratings (6 / 6) EVI-5 Pre-Proposal Web Conference

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- **Excellent:** A comprehensive, thorough, and compelling proposal of exceptional merit that fully responds to the objectives of the AO as documented by numerous and/or significant strengths and having no major weaknesses.
- **Very Good:** A fully competent proposal of very high merit that fully responds to the objectives of the AO, whose strengths fully outbalance any weaknesses.
- **Good:** A competent proposal that represents a credible response to the AO, having neither significant strengths nor weakness and/or whose strengths and weaknesses essentially balance.
- **Fair:** A proposal that provides a nominal response to the AO, but whose weaknesses outweigh any perceived strengths.
- **Poor:** A seriously flawed proposal having one or more major weaknesses (e.g., an inadequate or flawed plan of research or lack of focus on the objectives of the AO).

Note: Only Major Findings are considered in the rating.

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# Programmatic Assessment

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**NASA will take the following steps before making a recommendation for selection to the Steering Committee (Section 7 of SALMON-3 AO):**

- Hold Categorization Committee meeting to rank proposals from Category 1 (recommended for selection) to Category 4 (not recommended for selection).
  
- Of those ranked at Category 1 or 2; NASA will:
  - Conduct an internal assessment on the likelihood that NASA will be able identify and arrange an appropriate platform for the proposed investigation.
  - Assess the extent to which the proposed science investigation addresses unique science areas that are not being addressed by (or significantly enhance) other missions (both NASA and non-NASA missions) expected to be in operation 5 to 10 years from the start of the proposed investigation.
  - Assess the proposed funding profile relative to NASA's planned budgets to determine whether NASA can commit to the funding needs of the investigation.



# Key differences between the EVI-4 and EVI-5 solicitations



# Changes in EVI-5 from EVI-4 (1 / 3)

- EVI-5 solicitation is a PEA of the SALMON-3 AO instead of SALMON-2 AO.
- ISS will not be available as a proposed observation platform.
- References to the 2017 Earth Science and Applications from Space (ESAS) Decadal Survey replace earlier references.
- EVI-5 PEA solicits proposals that respond to 2017 Decadal Survey science questions as well as science goals outlined in the 2014 Science Mission Directorate Science Plan.
- The new SMD Guidelines for Class D missions are referenced in the PEA and are available in the EVI-5 Library.



# Changes in EVI-5 from EVI-4 (2 / 3)

- Proposers are cautioned to avoid substantial overlap with previously-selected space missions.
- ESSP PO support for certain communication activities, e.g., launch support, small brochures, mission in-orbit animations, project videos, key concept videos, and social media video series. Requires a “small” contribution from the project.
- 30-page limit for the Heritage Appendix – Section J.9 of the SALMON-3 AO.



# Changes in EVI-5 from EVI-4 (3 / 3)

- A Science Enhancement Option (SEO) for Class D / CubeSat investigations with a separate \$5M budget added for the following activities:
  - Enhanced applications activities;
  - Decreased data latency to enhance science objectives and/or the operational or applications objectives of other agencies or partners;
  - Enhanced calibration/validation activities;
  - More robust and wide-ranging science team support.

*The core investigation (without SEO) must still be viable and meet all requirements.*

- Applications section added using similar language to that used in the EVM-2 solicitation.
- An ITAR-free version of the proposal is required to be submitted via CD-ROM.



# Changes from Draft to Final EVI-5 PEA

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- Specified that NASA can accommodate the deployment of 1x1x6 CubeSats from ISS.
- Added a section on how proposers should treat Classified Materials.
- Explicitly refers to 2017 Decadal Survey's six science and application areas.
- Provided more explanation about foreign proposers and proposers from China.
- More explanation about threshold versus baseline requirements.
- Clarified that SEOs can be partially funded
- Greater explanation about the Communication Program for the Investigation
- Rewrote the sections about what happens when there is a gap between delivery and the integration of the instrument onto a spacecraft or launch vehicle.  
Able to support key personnel during gap.
- Updated the costing information for NASA Center personnel.

**(see also Change Document in EVI-5 Library)**



# Links and Reference Materials

Earth Venture Instrument-5  
Pre-Proposal  
Teleconference/WebEx

## **EVI-5 PEA**

The EVI-5 PEA will be accessed from the NSPIRES Website at <http://nspires.nasaprs.com/> and the EVI-5 Acquisition Homepage at <http://essp.larc.nasa.gov/EVI-5/>

## **Other reference documents**

Available on the EVI-5 Library at [http://essp.larc.nasa.gov/EVI-5/evi-5\\_library.html](http://essp.larc.nasa.gov/EVI-5/evi-5_library.html)

## **Review Process, Selection Criteria and other information**

For detailed information on these matters refer to presentations from the EVI-5 Pre-Proposal Workshop available at [http://essp.larc.nasa.gov/EVI-5/evi-5\\_prepropwebex.html](http://essp.larc.nasa.gov/EVI-5/evi-5_prepropwebex.html) and the [SALMON-3 AO](#)



# Questions?

## Questions and Comments

**All questions pertaining to the EVI-5 PEA MUST be addressed to:**

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Preferably by email at:

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Subject line to read "EVI-5 PEA"